JPRS 76350

3 September 1980

USSR Report

ELECTRONICS AND ELECTRICAL ENGINEERING

No. 71

FBIS FOREIGN BROADCAST INFORMATION SERVICE

NOTE

JPRS publications contain information primarily from foreign newspapers, periodicals and books, but also from news agency transmissions and broadcasts. Materials from foreign-language sources are translated; those from English-language sources are transcribed or reprinted, with the original phrasing and other characteristics retained.

Headlines, editorial reports, and material enclosed in brackets [] are supplied by JPRS. Processing indicators such as [Text] or [Excerpt] in the first line of each item, or following the last line of a brief, indicate how the original information was processed. Where no processing indicator is given, the information was summarized or extracted.

Unfamiliar names rendered phonetically or transliterated are enclosed in parentheses. Words or names preceded by a question mark and enclosed in parentheses were not clear in the original but have been supplied as appropriate in context. Other unattributed parenthetical notes within the body of an item originate with the source. Times within items are as given by source.

The contents of this publication in no way represent the policies, views or attitudes of the U.S. Government.

PROCUREMENT OF PUBLICATIONS

JPRS publications may be ordered from the National Technical Information Service (NTIS), Springfield, Virginia 22161. In ordering, it is recommended that the JPRS number, title, date and author, if applicable, of publication be cited.

Current JPRS publications are announced in Government Reports Announcements issued semimonthly by the NTIS, and are listed in the Monthly Catalog of U.S. Government Publications issued by the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.

Indexes to this report (by keyword, author, personal names, title and series) are available through Bell & Howell, Old Mansfield Road, Wooster, Ohio, 44691.

Correspondence pertaining to matters other than procurement may be addressed to Joint Publications Research Service, 1000 North Glebe Road, Arlington, Virginia 22201.

Soviet books and journal articles displaying a copyright notice are reproduced and sold by NTIS with permission of the copyright agency of the Soviet Union. Permission for further reproduction must be obtained from copyright owner.

JPRS 76350

3 September 1980

USSR REPORT

ELECTRONICS AND ELECTRICAL ENGINEERING

No. 71

CONTENTS

CERTAIN ASPECTS OF COMPUTER HARD AND SOFT WARE: CONTROL, AUTOMATION, TELEMECHANICS, TELEMETERING, MACHINE DESIGNING AND PLANNING

New Numerical Procedure for Calculation of Temperature Fields in a System of Bodies 1

A Holographic Memory With a Three-Coordinate Access Based on Volume Reflective Fourier Holograms 1

Use of Microprocessors in Protective Relaying and Automatic Fault Clearing Systems 2

A Device for Modelling Binary Communication Channels 3

Effectiveness of Using Plane Modular Digital Computer Structures 3

CERTAIN ASPECTS OF PHOTOGRAPHY, MOTION PICTURES AND TELEVISION

Acoustooptical Analyzing Device for a Light-to-Signal Converter.. 4

A Device for Alphanumeric Information Input Into a TV Display 5

The Influence of the Input Circuit of a Playback Channel of a Video Tape Recorder on the Signal to Noise Ratio 6

The Thermal Copying of Magnetic Signal Patterns 6

Analysis of the Stability of a Gyroscopic Stabilization System for a Motion Picture Camera 8

COMMUNICATIONS, COMMUNICATION EQUIPMENT, RECEIVERS AND TRANSMITTERS, NETWORKS, RADIO PHYSICS, DATA TRANSMISSION AND PROCESSING, INFORMATION THEORY

The Audio Broadcasting Equipment of the 1980 Olympics Television and Radio Complex 10

Specifications for Equipment and Accessories of a Public Address System in Railroad Stations 11

Estimating the Interference Immunity of Receivers With Rejection of Anomalous Errors 11

Automatization of Checking of Connector Relay Sets 12

Improvement of a Bay for Control of Transformer Substations 13

Technical Facilities of Complex Systems for Quality Control of the Telegraph Service 13

CONVERTERS, INVERTERS, TRANSDUCERS

Evaluation of Electrohydrodynamical Inverters With a Two-Phase Dielectric 14

Formalization of the Switching Algorithms for Thyristors in a 3-Phase Voltage Converter With Rectangular Pulse Width Modulation 14

Experimental Results of Investigation of the Electrical Parameters of High-Temperature Eddy-Current Transducers 15

Instrument Transducers of Voltage Amplitude and Frequency With a High Relative Signal Level 16

Temperature-to-Frequency Converter With a Semiconductor Sensitive Element 16

ELECTRICAL ENGINEERING EQUIPMENT AND MACHINERY: APPLICATIONS AND THEORY

A Method of Regularizing the Calculation of Electrostatic Fields 17

Arc Energy in Fast-Acting Fuses After Breaking a Direct Current 17

INSTRUMENTS, MEASURING DEVICES AND TESTERS, METHODS OF MEASURING, GENERAL EXPERIMENTAL TECHNIQUES

Use of Optical Spatial Filtering in Holographic Interferometry 19

A Method of Designing Tests for Discrete Devices by Means of a Tunable Random Input Generator 19

On Error Correction in Combination Circuits Where an Active Check Time Margin Is Available 21

On the Length of a Test Sequence for Circuits With a Memory 21

OPTOELECTRONICS, QUASIOPTICAL DEVICES

Influence of Anamolous and Normal Measuring Errors on Dimensional Characteristics of Angle Measuring Systems 23

To a Calculation of the Diffraction Efficiency of Magnetooptical Information Carriers of Optoelectronic Storage Devices 23

POWER SYSTEMS (INCLUDING EFFECT OF VARIOUS ITEMS ON POWER TRANSMISSION

Calculation of the Operating Modes of a Rectifier-Reactor-Inverter Converter System 25

RADARS, RADIONAVIGATION AIDS, DIRECTION FINDING, GYROS

Concerning Stability of a Gyroscope With an Internal Cardon Suspension on a Vibrating Base 26

Analysis of the Influence of Time Selection of a Signal Reflected From a Surface on the Measuring Precision of the Ground Speed 26

Dependency of Matching Accuracy of Radar Maps on the Range of Locator Operation 27

VARIOUS MISCELLANEOUS ITEMS, INCLUDING THEORIES

Investigation of the Thermal Conductivity of Porous Glass 28

CERTAIN ASPECTS OF COMPUTER HARD AND SOFT WARE: CONTROL, AUTOMATION, TELEMECHANICS, TELEMETERING, MACHINE DESIGNING AND PLANNING

UDC 512.8

NEW NUMERICAL PROCEDURE FOR CALCULATION OF TEMPERATURE FIELDS IN A SYSTEM OF BODIES

Leningrad IZV. VUZ: PRIBOROSTROYENIYE in Russian Vol 23, No 5, May 80 pp 86-90 manuscript received 25 Jan 79

USHAKOVSKAYA, Ye. D.

[Abstract] During recent years in various areas of technology (including instrument building) the necessity has appeared for analysis of the temperature fields of bodies and systems of bodies with complex thermal effects. The large number of numerical methods developed for solution of nonlinear algebraic and ordinary differential equations of the first order used in such analysis have deficiencies which impose serious limitations on their application. The present work proposes a new numerical method for solution of such equations. The proposed method, which is a method of forecasting and correction, i.e., computations at each stage of integration are carried out in two stages, is explained in detail. Calculations show that the proposed method is characterized by good resistance to a change of external effects and the initial conditions, has a simple algorithm suitable for realization of it on a computer, and requires a relatively small volume of internal storage (1.5--2 times less than for multistep methods). Use of the proposed method for integration of systems of differential equations makes it possible to reduce the expenditure of machine time by 2--5 times as compared with multistep and 20--100 times as compared with one-step methods of the Runge-Kutta type. The comparison of the expenditure of machine time was made with methods equivalent with respect to precision. The paper was recommended by the Department (Kafedra) of Thermophysics, Leningrad Institute of Precision Machines and Optics. References: 5 Russian.
[274-6415]

UDC 535.317:681.327

A HOLOGRAPHIC MEMORY WITH A THREE-COORDINATE ACCESS BASED ON VOLUME REFLECTIVE FOURIER HOLOGRAMS

Leningrad IZV. VUZ: PRIBOROSTROYENIYE in Russian Vol 23, No 5, May 80 pp 42-46 manuscript received 6 Jun 79

MAYOROV, S. A., OCHIN, Ye. F., ROMANOV, Yu. F. and TROPCHENKO, A. Yu.

[Abstract] The paper discusses the optical diagram of a holographic memory with three-coordinate access which is shown in the literature. The device is based on recording passing holograms in an electrooptical

crystal of lithium niobate doped with iron. In order to avoid superimposing images of adjacent pages during readout of information, the spacing of the change of the angle of incidence of the reference beam is selected so that it is not less than the angular width of the Briggovsk peak $\delta\theta_B$. This condition imposes a limitation on the magnitude P and consequently also on the capacity of the holograph memory. The present paper is concerned with a modification of the scheme mentioned above in order to assure the possibility of recording in the volume storage medium, not a passing hologram but a reflective Fourier hologram. A diagram of the holographic memory is presented, and the performance of the volume phase array in the channel for forming the reference beam is discussed. An evaluation is made of the data capacity of the device, with the condition that the maximum change of the angle of incidence of the reference beam amounts to 10°. The paper was recommended by the Department (Kafedra) of Computing Techniques, Leningrad Institute of Precision Mechanics and Optics. Figures 2; references 6: 2 Russian; 4 Western (one in translation).
[274-6415]

UDC 621.316.925

USE OF MICROPROCESSORS IN PROTECTIVE RELAYING AND AUTOMATIC FAULT CLEARING SYSTEMS

Minsk IZV. VUZ: ENERGETIKA in Russian No 5, May 80 pp 17-22 manuscript received 16 Oct 79

GUROV, N. S., candidate of technical sciences, FABRIKANT, V. L., doctor of technical sciences, professor, and CHUVYCHIN, V. N., candidate of technical sciences

[Abstract] Use of microprocessors in protective relaying and automatic fault clearing systems provides an alternative to a central computer. While both alternatives can be rated as equally advantageous in terms of system reliability and selectivity, decentralization with microprocessors offers more flexibility and simpler maintenance resulting in a better overall economy. The response speed in each case depends on the algorithm. Use of microprocessors requires analog-to-digital conversion of input data, where accuracy depends on both quantization frequency and word length, with digital filters found to be preferable to analog band filters. The paper was presented by the Department (Kafedra) of Automatic Electrical Systems, Order of Labor's Red Banner Riga Polytechnic Institute.
[289-2415]

UDC 654.2

A DEVICE FOR MODELLING BINARY COMMUNICATION CHANNELS

Leningrad IZV. VUZ: PRIBOROSTROYENIYE in Russian Vol 23, No 5, May 80
pp 15-19 manuscript received 4 Jan 79

GUSEV, A. I.

[Abstract] During a previous investigation by A. I. Gusev of the noise immunity of digital systems for data transmission based on a specialized modelling complex, in the development of devices the necessity appeared for modelling a communication channel. The present paper considers a device for modelling both a conventional communication channel and a binary communication channel with and without zone cancellation, the transition to which makes it possible in a number of cases to obtain a higher index of noise immunity for digital systems for data transmission. A functional diagram of the device is discussed. The paper was recommended by the Department (Kafedra) of Automatics and Telemechanics, Saratov Polytechnical Institute. Figures 4; tables 2; references: 5 Russian.
[274-6415]

UDC 681.332

EFFECTIVENESS OF USING PLANE MODULAR DIGITAL COMPUTER STRUCTURES

Novocherkassk IZV. VUZ: ELEKTROMEKHANIKA in Russian No 4, Apr 80
pp 376-378 manuscript received 6 Jul 77; after completion, 4 May 79

GUZIK, V. F., candidate of technical sciences, dotsent, Taganrog Institute of Radio Engineering; YEVTEYEV, G. N., head of OKB (Construction Bureau), Taganrog Institute of Radio Engineering; and PUKHOVSKIY, V. N., senior engineer, OKB (Construction Bureau), Taganrog Institute of Radio Engineering

[Abstract] A modular layout of digital computer structures consisting of digital integrators and electronic switches has been recently proposed where MxM functional modules are distributed over nodes in a two-dimensional grid. Each functional module contains a processor consisting of N digital integrators, its own switching system, an intermodular commutator and a tuning system. Such a structure offers both universality and flexibility. Here the effectiveness of such a structure is evaluated in terms of the utilization factor as a function of the grid dimension M and the degree of hardware complexity. Calculations reveal that such a modular structure compares favorably with a one-dimensional one for use in hybrid computer systems. Figures 1; references: 5 Russian.
[285-2415]

CERTAIN ASPECTS OF PHOTOGRAPHY, MOTION PICTURES AND TELEVISION

UDC 621.397.6:535.241.13:534+621.397.331.222

ACOUSTOOPTICAL ANALYZING DEVICE FOR A LIGHT-TO-SIGNAL CONVERTER

Moscow TEKHNIKA KINO I TELEVIDENIYA in Russian No 5, 1980 pp 41-44

BALAKSHIY, V. I., PARYGIN, V. N. and CHIRKOV, L. Ye., Moscow State University imeni V. M. Lomonosov

[Abstract] Recent (1975 to 1979) studies have demonstrated that acousto-optical devices can perform the functions of an analyzing element for a television light-to-signal converter. The operation of an acousto-optical analyzing device of this kind is based on the phenomenon of the diffraction of light beams in an ultrasonic traveling wave observed in photoelastic media. The feasibility of employing acoustooptical devices for TV image scanning was reported for the first time by Alippi et al. (1975). A schematic diagram is given of an acoustooptical analyzing device. It consists of two lenses between which is placed an acoustooptical cell. The first lens forms an image of the subject at the entry end of the acoustooptical cell, and the second lens collects the diffracted beams, focusing them on the surface of a photodetector. The photodetector just registers the result of scanning of the image line by line. The component of the light beam not undergoing diffraction is retarded by a diaphragm. The acoustooptical cell is in the form of a crystalline or vitreous material in which an ultrasonic wave is excited by means of a piezoelectric transducer. An acoustical filter leads the ultrasonic wave out of the cell, making possible the traveling wave mode. A short pulse of length T is fed to the piezoelectric transducer from a high-frequency oscillator and the transducer excites in the cell an ultrasonic wave in the form of a short train propagated at a velocity of v, where the length of the train equals $h = vT$. The cell is oriented in such a manner that the light beams strike the train at a specific angle in relation to the front of the acoustic wave. Since diffraction takes place only in the region of localization of the train, the train, traveling through the cell, sequentially scans the image along its path of movement. The size of a scanning element is determined by the length of the train and the scanning period, τ, is determined by the time for propagation of the train through the cell, i.e., $\tau = A/v$, where A is the aperture of the cell. A mathematical description is given of the acoustooptical analyzing device for a simplified physical model agreeing sufficiently well with strict theory. On the basis of the equations derived, an investigation is made of the dependence of the analyzing device's resolution on the parameters of the acoustooptical cell. Named among the advantages of the analyzing device discussed are the simplicity of its design and fabrication technology and its stability in relation to a change in the parameters of the external environment. It is able to operate over a wide temperature and pressure range, in vacuum and in chemically active media. The device is relatively small and can be executed in an integrated optical design. A key disadvantage is the absence of a charge storage effect, for the video signal picked

up from the photodetector is determined by the instantaneous velue of the intensity of light in the region of localization of the train. Acoustooptical devices can function not only in the visible, but also in the infrared region of the spectrum. An acoustooptical light-to-signal converter makes it possible to scan images with parameters satisfying the requirements of the television standard. The device described makes it possible to tune the converter's characteristics smoothly with regard to overall sensitivity, sensitivity for individual channels, the position of reference colors and the breadth of the color spparation range. Figures 3; tables 1; references 8: 7 Russian; 1 Western. [276-8831]

UDC 621.397.61.006:681.327.21

A DEVICE FOR ALPHANUMERIC INFORMATION INPUT INTO A TV DISPLAY

Moscow TEKHNIKA KINO I TELEVIDENIYA in Russian No 4, Apr 80 pp 57-59

SHENGELAYA, V. A., Tbilisi Radio and Television Center

[Abstract] An alphanumeric data input unit for a TV monitor is described, which is designed around K155 series IC's and uses K176RU2 series IC's in the memory. The unit performs the following functions: 1) The insertion in a standard TV signal of any text in either Russian or Georgian; 2) The input data capacity is 16 lines of 32 characters per line and the information can be positioned at any point on the TV screen or continuously moved in any direction vertically or horizontally; and 3) A text editing capability is provided and text punched in from the keyboard can be read out from the memory line by line. The unit has a permanent memory which contains 32 of the most frequently used phrases and one line of information from the immediate access operational memory can be added to each of them. No detailed schematics of the individual assemblies are given, though the functioning is described with three block diagrams showing the configuration. The main functional units are: a symbol generator, a switcher, a character position coordinator with a counter for the positions, a decoder and circuit for selecting the address of the character position in a line; a coordinator for lines with a line counter, a decoder and a circuit for selecting the address of a line in the field of the image; horizontal and vertical travel circuits; an immediate access memory and control unit for it; a read only memory for phrases, a phrase switcher, a clock (7 MHz), an adder and an output unit; a character encoder, a phrase encoder and an instruction encoder; an instruction decoder, a keyboard and VS-5-10 and BPT-15 power supplies. Figures 3. [254-8225]

UDC 621.397.611 videomagnitofon

THE INFLUENCE OF THE INPUT CIRCUIT OF A PLAYBACK CHANNEL OF A VIDEO TAPE RECORDER ON THE SIGNAL TO NOISE RATIO

Moscow TEKHNIKA KINO I TELEVEDENIYA in Russian No 4, Apr 80 pp 37-40

TARYGIN, Ye. K. and KHARITONOV, M. I., All-Union Scientific Research Institute for Television and Radio Broadcasting

[Abstract] Two types of playback amplifiers are widely used in video tape recorders: those with a high-impedance input (such as in the Kadr-3 and Kadr-3P recorders) and low-input impedance (100 - 300 ohms) amplifiers (in the Kadr-5). The influence of these input circuit configurations on the output signal-to-noise ratio of a VTR is analyzed to derive analytical expressions for the optimal signal-to-noise ratio and circuit parameters. The basic circuit configuration shows the input network followed by a playback amplifier, an equalizing network, an FM equalizer, a filter with a linearly falling response and finally, a limiter. The equivalent circuit is drawn along with the equivalent noise circuit of the input network and parameters maximizing the signal-to-noise ratio for both the low and high impedance configurations are found. The recommended variant is the low impedance input such as used in the AVR-1, TR-600 and Kdr-5 VTR's: a cascade amplifier looped by negative feedback. Specific circuit parameters are given and the signal-to-noise ratio at the playback channel output is plotted as a function of the important parameters of the input transformer as well as the load impedance. The design considerations and analytical expressions derived in this paper were applied to the optimization of the input circuit of the playback channel of the Kadr-5 VTR and boosted the signal-to-noise ratio by several dB. Figures 9; refererces: 5 Russian; 1 Western (in translation).
[254-8225]

UDC 621.397.611:681.84.083.8

THE THERMAL COPYING OF MAGNETIC SIGNAL PATTERNS

Moscow TEKHNIKA KINO I TELEVIDENIYA in Russian No 4, Apr 80 pp 41-46

PAVLOV, A. Yu., All-Union Scientific Research Institute for Television and Radio Broadcasting

[Abstract] The advent of chromium dioxide tapes with a curie point of about 400° K has made it possible to consider the feasibility of using thermomagnetic contact copying of video tapes for large scale tape duplication. A general discussion of thermomagnetic contact printing

for tape duplication, dealing with both dynamic and bifilar tape transport configurations for the heating process, is followed by details of experimental studies of thermomagnetic printing of recorded signals. An argon laser beam is focused on the working layer of a tape containing CrO_2 and gamma Fe_2O_3 powder, where the laser beam heat source is directed from the transparent side of the copy tape. The copy tape is made of CrO_2 (CV26AEp130 tape made by BASF). The reflection and absorption losses of the laser beam in the transparent base of the copy were measured at 30%. Thermal printing efficiency was studied in the audio range from about 50 to 10,000 Hz: signals were recorded across the entire width of a gamma Fe_2O_3 original tape using high frequency bias, a tape speed of 9.53 cm/sec and a record level of 32 nWb/m. After the thermocopying of this tape, the output voltage was measured for the copy and the record track was visualized magneto-optically using a ferrite-garnet film. In contrast to the thermomagnetic contact printing described in the literature, this thermocopy process does not produce any warping of the magnetic line, which degrades the resolution of the recording. Thermocopy efficiency ranged from 1.0 at about 50 Hz to about 1.6 at 7,500 Hz, where the efficiency is defined as the ratio of the output voltage of the copy to the output voltage of the original, referenced to the visualized recorded track of the copied tape. This high efficiency is explained by the high sensitivity of the process. The optimum laser mode is that where the working layer of the copy tape is heated to the curie point through its entire depth, yet there is no deformation of the base. The amplitude-frequency response of the process is shown graphically as well as the third harmonic distortion as a function of the record level of the original. Besides the wide tracks (0.8 to 1.6 mm), the laser beam was finely focused to obtain very narrow record tracks (10 to 20 micrometers). The feasibility of thermocopying using a laser beam is thus demonstrated; the process provides for better utilization of the tape vehicle as regards magnetization than recording with high frequency bias; and as compared to thermomagnetic contact printing, the proposed process has two important features: 1) The nonuniformity of the heating of the working layer with the bounds of the light spot does not degrade the longitudinal record density; and 2) With the same high longitudinal recording density, it is possible to make better use of the working layer through its thickness. Figures 7; references 8: 2 Russian; 6 Western.
[254-8225]

UDC 778.53-752

ANALYSIS OF THE STABILITY OF A GYROSCOPIC STABILIZATION SYSTEM FOR A MOTION PICTURE CAMERA

Moscow TEKHNIKA KINO I TELEVIDENIYA in Russian No 5, 1980 pp 29-31

BUDKIN, V. L., MELAMED, Yu. I., MUN'KIN, V. B. and FATEYEV, V. V., All-Union Scientific-Research Motion Picture Photography Institute

[Abstract] An analysis is made of the stability of a system for gyroscopic stabilization of a motion picture camera; the system discussed is in the form of a triaxial gyrostabilizer in which around the horizontal and vertical panning axes is utilized a double-loop gyroscopic stabilization system with a balance wheel, and around the optical axis an indicator-type gyroscopic stabilization system. The analysis here focuses on a double-loop gyroscopic stabilization system with a balance wheel, particularly, on an analysis of one of the identical stabilization channels. The stabilizing moment is proportional to the angular error of the platform and the two-degrees-of-freedom gyroscope installed on the platform. Unlike the indicator-type gyrostabilizer, the stabilizing motor is fastened not to the rings of a Cardan's suspension, but to a balance wheel placed on the platform. The close positioning of the gyroscope and balance wheel ensures sufficiently high rigidity in the loop for transmission of the stabilizing moment and makes it possible to improve stabilization accuracy. This arrangement requires stabilization of the balance wheel, which is easily achieved by adding an additional relief loop. When disturbing moments act on the platform, the platform's angle of displacement is read in the system of coordinates modeled by the two-degree-of-freedom gyroscope. A signal proportional to this angle is fed from the gyroscope's angle sensing element to the stabilization loop amplifier-converter. The amplified and converted signal is fed from the output of the amplifier to the stabilizing motor, which produces a moment which compensates the disturbing moment. The reaction in the stabilizing motor acts on the balance wheel and causes it to move relative to the platform. A signal proportional to the angular error of the platform and balance wheel is picked up from an element for sensing the balance wheel's position and is fed tothe input of an amplifier-converter in the relief loop. The amplified and converted signal from the output of this amplifier is fed to a relief motor which produces a moment compensating the reaction in the stabilizing motor. The system is analyzed by means of the root hodograph method. The system contains two automatic regulation loops: the stabilization loop, consisting of the gyroscope's angle sensing element, the amplifier-converter and the stabilizing motor; and the relief loop, consisting of the sensing element for the position of the balance wheel, the amplifier-converter and the relief motor. It is demonstrated that for the purpose of improving the system's quality with regard to dynamic accuracy of the stabilization system it is necessary to add special correcting devices. It is demonstrated

that for the purpose of ensuring reliability of the conductors to the elements located on the balance wheel it is desirable to have not too great an amplitude of balance wheel vibrations and the rapid damping of vibrations. Certain errors of the stabilization system caused by moments originating in rocking of the basis are discussed. It is demonstrated that it is possible to ensure stability of a two-loop gyroscopic stabilization system with a balance wheel by adding differentiating elements to the stabilization loop and relief loop. It is possible to reduce the error arising in rocking of the base considerably, as compared with an indicator-type gyrostabilizer, by using a two-loop stabilization system with a balance wheel. Figures 1; references: 3 Russian. [276-8831]

UDC 621.396.97:796.092.1(100)

THE AUDIO BROADCASTING EQUIPMENT OF THE 1980 OLYMPICS TELEVISION AND RADIO COMPLEX

Moscow TEKHNIKA KINO I TELEVEDENIYA in Russian No 4, Apr 80 pp 49-55

KOCHUASHVILI, K. Z. and KUDRIN, I. G.

[Abstract] All of the technical facilities for generating broadcast programs at the 1980 olympics can be conventionally broken down into three major groups: the audio (sports commentator) complex at the sports facilities, the system for signal transmission from the sports facilities to the Olympcis Television and Radio Center (OTRTs) and the feed of ready programs to the individual countries (via Communications Ministry channels) and the studio--equipment room complex at the OTRTs. This paper deals in detail with the structure and operation of the studio and equipment room complex, where the major technical facilities for originating the feeding out programs are concentrated, as well as the engineering and service rooms (editing rooms, repair services rooms, operational and administrative personnel). Provisions are made for 600 announcer positions for radio out of an overall number of 1,200 sports commentators at the olympics; the programs which can be simultaneously transmitted to other countries number around 100. The studio and equipment room complex for radio broadcasting (ASK-RADIO) is composed of 70 broadcast program studios + equipment rooms, 30 installation equipment rooms, 3 commentator recording studios, 5 program playback equipment rooms, 10 audio recording and monitor studios, 2 technical monitoring rooms and a recording library. The various types of leased channels offered to subscribers are detailed along with all of the editing, recording and program feed facilities. The use of some western equipment is noted, such as the TM-600 studio tape recorders and SL-101 turntables. Block diagrams illustrate the functional configuration of the complex, the operation of a primary broadcast program equipment room and the structure of the central switching and distribution radio broadcasting equipment room. Figures 3.
[254-8225]

UDC 656.211.5:656.254.16:521.396.66

SPECIFICATIONS FOR EQUIPMENT AND ACCESSORIES OF A PUBLIC ADDRESS SYSTEM IN RAILROAD STATIONS

Moscow AVTOMATIKA, TELEMEKHANIKA I SVYAZ' in Russian No 5, May 80 pp 35-40

SHVETSOV, N. N., engineer, VNIIZhT [All-Union Scientific Research Institute of Railroad Transportation Engineers]

[Abstract] A public address system in a railroad station includes, in addition to a distribution panel, main and standby amplifiers, and a power panel, also a microphone, a magnetophone, and a control panel in the announcer's booth, loudspeakers with feeder lines, microphone lines, switches and relays, a remote-control channel, and power supply lines. Here each item is reviewed in terms of pertinent performance and design requirements, including size and special features. The technical characteristics of existing models of equipment in use are given, in the case of microphones also their radiation pattern and frequency characteristics. This review is based on earlier studies made by various other authors, particularly noteworthy being those pertaining to amplifiers for this application. Acoustical and electrical characteristics of radio engineering equipment for transmission of spoken messages were studied by specialists of the VNIIZhT: candidate of technical sciences G. V. BUTAKOV, candidate of technical sciences, N. P. TAGER and junior research worker M. M. TOMASHEVSKAYA. They also made the recommendations for sound-equipping extra-class railroad stations. Figures 6; tables 6; references: 3 Russian. [286-2415]

UDC 656.254.16:621.396.669.001.5

ESTIMATING THE INTERFERENCE IMMUNITY OF RECEIVERS WITH REJECTION OF ANOMALOUS ERRORS

Moscow AVTOMATIKA, TELEMAKHANIKA I SVYAZ' in Russian No 5, May 80 pp 10-12

ZHURAVLEVA, L. M., candidate of technical sciences, assistant, Moscow Institute of Railroad Transportation Engineers, and KOSTROMA, V. S., engineer

[Abstract] Phase skipping caused by fluctuation interference in railroad radio communication systems with angle modulation is the most serious source of anomalous errors in the receiver. These errors can be suppressed by means of a rejection device consisting of a quasi-optimal detector and a chopper in either the high-frequency or the low-frequency receiver channel, but preferably behind the demodulator. The quasi-optimal filter in the detector extracts anomalous errors from the background of useful

signals and normal noise. Between the chopper and the microphone there is a low-pass and restoration loop. The interference immunity of such a system is here estimated in terms of the total mean-square error, taking into account a priori and a posteriori probabilities of nondetection and false-alarm detection of an anomalous error. This mean-square error is further calculated as a function of the threshold signal-to-noise power ratio (at which threshold the normal component of the mean-square error equals the sum of all its other components), for various values of the peak frequency-modulation index and of the probability of nondetection or false-alarm detection (both assumed to be equiprobable) of an anomalous error. An analysis of the theoretical results and also of real receivers with rejection indicates a definite payoff which increases with decreasing false-alarm (or nondetection of anomalous error) probability. Large errors introduced by stepwise interpolation of rejected message segments, with a standard frequency discriminator used as the demodulator, lower the effectiveness of this device. Subsequent restoration improves the performance. Use of a tracking demodulator would most effectively improve the interference immunity of the receiver system. Figures 2.
[286-2415]

AUTOMATIZATION OF CHECKING OF CONNECTOR RELAY SETS

Moscow VESTNIK SVYAZI in Russian No 5, May 80 pp 22-23

FRUMKINA, G. M., senior engineer, Leningrad Division, Central Scientific Research Institute of Communications, and SHAPIRO, E. A., senior engineer

[Abstract] A new PRSL-2 device has been designed and built for automatic checking of connector relay sets in crossbar telephone exchanges, to replace the existing manually operated PRSL device. It operates together with a 3-frequency receiver of 450 Hz ring and busy signals as well as 700 and 100 Hz voice-channel test signals. Without an automatic responder available, the checking is done semiautomatically. The algorithm of the checking process, including all preliminary steps and necessary connections, have been programmed for any type of connector relay set. Pushbutton operation with this PRSL-2 device reduces the complete checking time by approximately 50%, as demonstrated by practical experience. Figures 1.
[288-2415]

IMPROVEMENT OF A BAY FOR CONTROL OF TRANSFORMER SUBSTATIONS

Moscow VESTNIK SVYAZI in Russian No 5, May 80 pp 26-28

KOYRAKH, N. I., engineer, production laboratory of the Kherson municipal radio relay station

[Abstract] Radio relay stations use UKTP-1 bays for control of their transformer substations. Such bays in the Kherson municipal radio relay station have been improved so that it is now possible to switch on and off as well as to check a standby amplifier, to control both standby and main amplifiers, to control the 3-program broadcasting transmitters, to monitor the second and the third programs through one connecting line. These improvements have been achieved by utilizing the free bay section for appropriate additions and connections of relay contacts. At the same time, the reliability of these bays has been increased by redesign of relay circuits and proper selection of resistors so as to ensure the necessary voltage for actuation and to remove the voltage during idle time. With the distribution feeder physically located between two transformer substations, it is moreover possible to use each as a standby for the other. All these improvements have so far saved approximately 2,000 rubles in annual operating costs. Further improvements based on utilization of available technical capability should be possible. Figures 4.
[288-2415]

TECHNICAL FACILITIES OF COMPLEX SYSTEMS FOR QUALITY CONTROL OF THE TELEGRAPH SERVICE

Moscow VESTNIK SVYAZI in Russian No 5, May 80 pp 32-35

ZHEVLYUK, K. S., chief of engineering department, Main Telegraph Administration, USSR Ministry of Communications, ROMANTSOVA, L. D., chief, department of automatic stations, and NOVIKOV, V. V., engineer

[Abstract] A complex system for quality control of the telegraph service has been developed for the purpose of improving the quality by objective inspection of station personnel as well as terminal and channel equipment performance with the aid of measuring and recording instruments. Transmission of telegrams is checked, by correctness of first and last symbols, with a DKRT set. Automation of measuring and recording operations in terminals is incorporated in TAKT, KANT, KONTUR sets. For improvement of service available ISOTOP-2 facsimile transmitting and receiving sets are to replace NEVA and SHTRIKH sets now in use, also for direct-dialing systems DUMKA and DNEPR channel multiplexing (time sharing) sets as well as the UPPT telegram transcriber, the ZONA-S screener of illegible symbols, the VREMYA coder and several others. Figures 4.
[288-2415]

CONVERTERS, INVERTERS, TRANSDUCERS

UDC 538.3

EVALUATION OF ELECTROHYDRODYNAMICAL INVERTERS WITH A TWO-PHASE DIELECTRIC

Leningrad IZV. VUZ: PRIBOROSTROYENIYE in Russian Vol 23, No 5, May 80 pp 32-36 manuscript received 2 Jan 79

NAGORNYY, V. S.

[Abstract] The newly-developed electrohydrodynamical inverters with a two-phased dielectric, the EGOP-2F, described in two 1973 papers, one by V. S. Nagornyy and the other by Nagornyy and A. A. Denisov are used in feedback circuits and intended for conversion of an electrical signal into pressure in liquid, with capacitance-type sensors of undercompensation. In the present paper a method is proposed for evaluation of the static and dynamic characteristics of these inverters. The results are presented of a comparative analysis of the experimentally removed characteristics of the EGOP-2F with theoretical calculations. The analysis conducted shows that the converters in question can be effectively used in compensation circuits for measurement of pressures. The paper was recommended by the Department (Kafedra) of Automatics and Computing Techniques, Leningrad Polytechnical Institute imeni M. I. Kalinin. Figures 2; references 4: 3 Russian; 1 Western.
[274-6415]

UDC 621.314.572

FORMALIZATION OF THE SWITCHING ALGORITHMS FOR THYRISTORS IN A 3-PHASE VOLTAGE CONVERTER WITH RECTANGULAR PULSE WIDTH MODULATION

Novocherkassk IZV. VUZ: ELEKTROMEKHANIKA in Russian No 4, Apr 80 pp 386-390

CHERNOV, S. S., candidate of technical sciences, senior scientific research worker, Leningrad Institute of Railroad Transportation Engineers

[Abstract] Rectangular pulse width modulation is used for internal regulation of the inverter voltage in electrical traction and other 3-phase systems. The problem considered here is formatization of the switching algorithms for mathematical simulation of the inverter performance. It is assumed that the inverter draws power from an infinite source and supplies a symmetric 3-phase load through ideal rectifiers with instantaneous commutation. With the concept of control functions introduced appropriately and with their relation to the output voltage functions established, $2^{K/6}$ switching alrogithms are found to be possible (K denoting the number of pauses or pulses during one period of the

phase voltage) and they are formalized for the two most practical variants of pulse width modulation. Figures 2; tables 1; references: 3 Russian.
[285-2415]

UDC 621.317.39.088.096

EXPERIMENTAL RESULTS OF INVESTIGATION OF THE ELECTRICAL PARAMETERS OF HIGH-TEMPERATURE EDDY-CURRENT TRANSDUCERS

Leningrad IZV. VUZ: PRIBOROSTROYENIYE in Russian Vol 23, No 5, May 80
pp 28-32 manuscript received 30 May 79

ZAPUSKALOV, V. G.

[Abstract] The paper is concerned with the pressing problem of obtaining information concerning the degree of change of Q and inductance of a small-sized shielded transducer with coils of circular and octal-shaped configuration under conditions of the extreme effect of temperature on the one hand, as a function of the change of the value $\eta = \frac{D_E}{D_N}$ (where D_E is the internal diameter of the shielding casing and D_N is the external diameter of the coil); and on the other as a function of the change of the gap z between the superposed current-conducting plate and the end face of the shielder coil. The investigations conducted and an analysis of the results obtained make it possible to conclude with great certainty that the stability of the electrical parameters to the temperature effect, and the linearity and sensitivity of the output characteristic to the space z being measured of a small-sized superposed transducer with a coil of octal-shaped configuration considerably exceed, with respect to the magnitude of stability, linearity and sensitivity, other conditions being equal, a transducer with a coil of circular configuration, analogus with respect to design. The paper was recommended by the Department (Kafedra) of the Technology of Machine Building, Moscow Higher Technical School imeni N. E. Bauman. Figures 5; references: 2 Russian; 1 Western.
[274-6415]

UDC 621.317.322+621.317.361.087.9

INSTRUMENT TRANSDUCERS OF VOLTAGE AMPLITUDE AND FREQUENCY WITH A HIGH RELATIVE SIGNAL LEVEL

Novocherkassk IZV. VUZ: ELEKTROMEKHANIKA in Russian No 4, Apr 80 pp 379-385 manuscript received 14 Apr 77; after completion 29 Dec 77

LEN'KOV, Yu.A., engineer, and OVCHARENKO, N. I., candidate of technical sciences, dotsent, both of Moscow Institute of Power Engineering

[Abstract] Galvanomagnetic transducers of voltage amplitude and frequency are considered for automatic strong-signal regulation of the excitation system in 3-phase synchronous generators. The performance of such a transducer, consisting of two identical Hallotrons in the secondary circuits of two transformers and converting generally asymmetric a.c. voltages in a 3-phase system to a d.c. voltage fed to an operational amplifier, is here analyzed on the basis of equivalent-circuit relations and phasor diagrams. Three different variants of connection to the generator winding are considered, and in each case the response to the various possible line-to-line faults as well as to a triple-line fault. Figures 3; tables 1; references: 7 Russian.
[285-2415]

UDC 621.372.63

TEMPERATURE-TO-FREQUENCY CONVERTER WITH A SEMICONDUCTOR SENSITIVE ELEMENT

Leningrad IZV. VUZ: PRIBOROSTROYENIYE in Russian Vol 23, No 5, May 80 pp 11-14 manuscript received 3 Oct 79

ALI-ZADE, G. A., ALI-ZADE, D. G. and LESHCHINSKIY, Yu. B.

[Abstract] A temperature-to-frequency converter is described which has a linear output characteristic. The nonlinearity of the converter in the range +20 -- +120° C is within the limits from one to two percent and the variance from unit to unit within the limits from 0.5 to 1.0 percent. The method of choosing the elements of the circuit is substantiated. The proposed circuit was executed in two versions: 1) Using transistors 2T312V and 2T337B; and 2) A 4-layer structure based on Type KEF 4.5/KDB 0.03 silicon was especially produced according to standard technology for production of integrated circuits. The paper was recommended by the Department (Kafedra) of Information-Measuring and Computing Techniques, Azerbaydzan Institute of Petroleum and Chemistry imeni M. Azizbekov. Figures 2; references: 4 Russian.
[274-6415]

UDC 537.212.001.24

A METHOD OF REGULARIZING THE CALCULATION OF ELECTROSTATIC FIELDS

Minsk IZV. VUZ: ENERGETIKA in Russian No 5, May 80 pp 92-93 manuscript received 24 Sep 79

IL'YENKO, O. S., candidate of technical sciences, dotsent

[Abstract] Electrostatic fields are calculated by solving integral equations of the first kind. Such a problem is generally ill-conditioned, but can be regularized by reduction to an integral equation of the second kind. Here such a regularization is shown applicable specifically to an electrostatic field between electrodes of finite thickness at given potentials. With the charge density on the electrode surface regarded as proportional to the electric field intensity near that electrode, the integral equation of the first kind for the charge distribution as a function of the potential difference is reduced to one of the second kind which has a simple kernel and then to a recurrence relation which requires only approximately 20 iterations for yielding results accurate within 7 percent. The paper was presented by the Department (Kafedra) of High-Voltage Engineering, Order of Lenin Kiev Polytechnic Institute imeni Semicentennial of the Great Socialist October Revolution. References: 4 Russian.
[289-2415]

UDC 621.316.923:621.3.014.31

ARC ENERGY IN FAST-ACTING FUSES AFTER BREAKING A DIRECT CURRENT

Novocherkassk IZV. VUZ: ELEKTROMEKHANIKA in Russian No 4, Apr 80 pp 355-360

NAMITOKOV, K. K., doctor of technical sciences, professor, Kharkov Institute of Municipal Economics; KHMEL'NITSKIY, R. S., department head; SHKLOVSKIY, I. G., candidate of technical sciences, laboratory director, All-Union Scientific-Research Institute of Electrical Equipment, and IL'INA, N. A., senior scientific research worker, All-Union Scientific-Research Institute of Electrical Equipment, Kharkov

[Abstract] The maximum energy dissipated in the arc after breaking of a short-circuit current is an important consideration in the development and design of fuses for higher current ratings. Here this energy is calculated from the differential equation which described the process of breaking a direct current. The problem is further to determine the optimum voltage control yielding the maximum arc energy. With maximum permissible arc voltage and the minimum possible arc voltage given, also

assuming the process to be adiabatic, the optimization problem is solved according to Pontryagin's principle of the maximum and reduced to minimization of the appropriate Hamiltonian. As a result, an expression is obtained for the arc energy as a function of the fuse melting current, of the circuit resistance and inductance, and of the arc voltage. Calculated are also the energy fed to the arc from the network, which during arc glow can become equal to or even exceed the energy stored in the inductance, and the energy loss on Joule-effect heating in the resistance. The arc energy is found to be maximum at an arc voltage equal to the supply network voltage. Theoretical results compare with experimental data pertaining to aluminum and silver fuse ribbons. Figures; tables 1; references: 2 Western (1 in translation).
[285-2415]

INSTRUMENTS, MEASURING DEVICES AND TESTERS, METHODS OF MEASURING, GENERAL EXPERIMENTAL TECHNIQUES

UDC 535.4.004.14:681.14

USE OF OPTICAL SPATIAL FILTERING IN HOLOGRAPHIC INTERFEROMETRY

Leningrad IZV. VUZ: PRIBOROSTROYENIYE in Russian Vol 23, No 5, May 80 pp 47-52 manuscript received 21 Sep 79

KAZAK, V. L., NAGIBINA, I. M. and SITNIK, D. N.

[Abstract] The high information content of wave fields under analysis, the low quality of the interferograms and the labor intensity of interpreting methods limit the possibilities for the use of holographic interferometry. Attempts are being made at this time for an extension of these possibilities by the methods of optical space filtering. The present paper analyzes the forming and interpreting of holograph interferograms and considers the possible uses of optical space filtering. It is shown that frequency analysis of systems for forming holographic interferograms makes it possible to take into account filtering of the spectrum of space frequencies of an object, both at the stage of recording of the hologram and during re-establishment of the objective field. Frequency analysis of holographic interferograms shows that the methods of optical space filtering are useful for interpreting and improving the quality of interferograms. The paper was recommended by the Department (Kafedra) of Spectral and Optophysical Devices, Leningrad Institute of Precision Mechanics and Optics. Figures 1; references: 6 Russian.
[274-6415]

UDC 615.471:62-504

A METHOD OF DESIGNING TESTS FOR DISCRETE DEVICES BY MEANS OF A TUNABLE RANDOM INPUT GENERATOR

Moscow AVTOMATIKA I TELEMEKHANIKA in Russian No 4, Apr 80 pp 122-131 manuscript received 19 Sep 79

ZHUKOV, M. V., Moscow

[Abstract] A procedure is proposed for testing complex discrete devices. A tunable random input generator is used and the completeness of the test is improved; better completeness is understood to be either an increase in the number of faults found by an input sequence based on this procedure over that found by sequences of the same length based on known probabilistic method, or a reduction in the testing time with identical sequence lengths. This improvement in completeness is achieved through the analysis of the structure of the device being tested and the generator is then appropriately adjusted to check a defined set of constant faults. The basis of the procedure is the assumption that the generator sequence

will be close in terms of its test properties to a regularly constructed sequence realizing the same strategies when tracing the paths, and the same predetermination of the branching nodes and inputs to the elements as a random sequence. The limitation placed on the discrete device being so tested is a lack of global feedback loops. This limitation can be eliminated in practice in two ways. The first consists in referencing the structure to a form suitable for checking by means of introducing artificial breaks in the feedback loops; the second approach describes a fragment of the discrete device circuitry looped by such feedback as an independent element of a memory and compiling rules for it based on the procedures given here. The first approach is preferable since it does not involve outlays for programming for new nonstandard elements, i.e. the introduction of these elements and rules for their calculation into standard libraries. Where both of these approaches are unacceptable, a possible variant is the artificial breaking of the feedback loops only in the model of the discrete device being tested, something which naturally leads to an increase in the inaccuracy of the final result, which will nonetheless not too significant with a small number of global feedback loops. Because the selection of the initial set of defects to be checked is arbitrary, it can turn out that a defect falls in a set, the testing of which requires frequency characteristics of the inputs substantially different that the characteristics derived for the entire set. The probability of defect detection in this case decreases sharply and it is therefore recommended that the test sequence be derived on a step by step basis. The efficiency of the procedure is illustrated graphically where the probability of obtaining a fully reliable test and the completeness of the test for various cases of random input generator alignment are shown as a function of the number of sets generated. The case analyzed is that of a five-input AND gate. The curves for generator set-up based on the proposed procedure show fault detection much faster than in the case of the statistical approach of using the 50% probability of the appearance of a "one" signal at each generator output. The proposed method was also applied to the testing of standard IC's containing several hundreds of defects and the anticipated efficiency was confirmed. Figures 5; references 7: 5 Russian; 2 Western.
[235-8225]

UDC 681.326.7

ON ERROR CORRECTION IN COMBINATION CIRCUITS WHERE AN ACTIVE CHECK TIME MARGIN IS AVAILABLE

Moscow AVTOMATIKA I TELEMEKHANIKA in Russian No 4, Apr 80 pp 132-142
manuscript received 14 Jul 79

OSTAFIN, V. A. and ROMANKEVICH, A. M., Kiev

[Abstract] The concept of active check time reserve is defined as the maximum time segment, starting when an input set is fed in, and with the expiration of which, the correct output signals of the circuit should appear. During this brief time, the information input into the circuit is blocked and an experiment can be performed on it (i.e., a certain sequence of test sets is fed to the input of the circuit being tested). The correcting signals are generated from the signals appearing at the output buses of the circuit. The basic circuit configuration analyzed is: the circuit being corrected is followed by a correcting device which is driven by a circuit generating the error correcting signals, and is thus tied directly to the outputs of the circuit being corrected; the outputs of the correcting device are the desired functions. The complexity of the circuit for correcting constant failures and drop-outs in multifunction circuits is estimated where this active check time reserve is available in the circuit being corrected. The possibility of simplifying of the correcting circuit is demonstrated for this case. An analytical expression is derived for the lower estimate of the complexity. The design of a correcting circuit having an asymptotically minimal complexity is possible through the utilization of the best error correcting codes and the optimal exploitation of the time margin. Figures 5; references: 7 Russian.
[255-8225]

UDC 681.326.74.06

ON THE LENGTH OF A TEST SEQUENCE FOR CIRCUITS WITH A MEMORY

Moscow AVTOMATIKA I TELEMEKHANIKA in Russian No 4, Apr 80 pp 190-192
manuscript received 9 Apr 79

KOZLOVSKIY, V. A., Donetsk

[Abstract] It is difficult to compare algorithms used in diagnostic work for the generation of test sequences for circuits with a memory because of the lack of appropriate estimates of one of the most important parameters: the sequence length. Such estimates would make it possible to judge the algorithm efficiency to a certain extent and provide a

theory for experiments with automats. However, these estimates are very high because of the fact that powerful classes of faults are treated. For the theory of experiments itself, it would be interesting to have examples of those classes of automats, for which the lengths of the tests would be substantially lower than in the general case. This paper deals with a solution to this problem which somewhat satisfies both sides of the issue, specifically: the estimation of the length of a test sequence for a synchronous sequential circuit for sets of constant defects at the circuit input. The theory of experiments with automats is applied to derive two theorems in this case. It is assumed that all of the variables in the input sets are real; it is known that in the general case where F is the class of all automats with a number of states no greater than the number of states n of nondefective automat A, the height of the experiment does not exceed a level of 2n - 1, while the multiplicity factor does not exceed mn^2 where m is the power of the input alphabet. It turns out that even in the case considered here, when the class F is significantly smaller, a lowering of the estimates is possible only for the multiplicity factor of the experiments. The following two theorems are derived:

1. For an initial automat with n states relative to the class F, there exists a testing multiple experiment E, the height of which does not exceed 2n - 1, while the multiplicity factor is not greater than 2k.
2. For an initial automat A relative to the class F, there exists a simple experiment of a length no greater than $(2n - 1)(1 + 2k \ln(en3^k/2k))$.

The author thanks I. S. Grupskiy for a number of useful comments. References: 4 Russian.
[255-8225]

OPTOELECTRONICS, QUASIOPTICAL DEVICES

UDC 621.376.5

INFLUENCE OF ANAMOLOUS AND NORMAL MEASURING ERRORS ON DIMENSIONAL CHARACTERISTICS OF ANGLE MEASURING SYSTEMS

Leningrad IZV. VUZ: PRIBOROSTROYENIYE in Russian Vol 23, No 5, May 80
pp 69-74 manuscript received 4 Sep 78

KALINCHUK, V. I. and MOROZOVA, N. G.

[Abstract] The paper is concerned with the development of procedures for calculation of the energy characteristics of optoelectronic angle measuring systems with respect to a specified level of anomalous and normal measuring errors, as well as the dimensions of the receiving optical system (objectives) as a function of the specified errors of determination of the coordinates of the image of the radiation source. A graph is presented which makes it possible to form an opinion concerning the magnitude of the cumulative error of measurement as a function of ρ (signal-to-noise ratio in execution) and confirms the theoretical premises placed at the basis of the procedure found for calculation of measurement errors. The paper was recommended by the Department (Kafedra) of Optoelectronic Devices, Leningrad Institute of Precision Mechanics and Optics. Figures 5; references: 5 Russian.
[274-6415]

UDC 681.3.07:681.327.2

TO A CALCULATION OF THE DIFFRACTION EFFICIENCY OF MAGNETOOPTICAL INFORMATION CARRIERS OF OPTOELECTRONIC STORAGE DEVICES

Leningrad IZV. VUZ: PRIBOROSTROYENIYE in Russian Vol 23, No 5, May 80
pp 7[illegible]-80 manuscript received 6 Jun 79

YAN[illegible]K, V. I.

[Abstract] Diffraction efficiency is one of the basic energy parameters which is taken into account during investigation of magnetofilm media as an information carrier of optoelectronic storage devices. Recording of the signal read out from the film is based on the use of magnetooptical effects. A relationship is derived in the present paper which makes it possible to formulate the requirements on the minimum magnitude of the quality index of the medium necessary for accomplishment of holographic readout with an assigned frequency of rotation and duration of the pulse which is read out, the thermophysical constants of the film, the sensitivity of the photo detector and the information recording density. The maximum quantity of the readout pulses, at which the heating temperature of the film reaches the Curie Point T_k, is determined from the condition of

the provision for nondestructive readout. An equation is derived for the heating temperature of the film during the effect of laser emission. Curves are presented which represent the dependence of the efficiency of holographic readout on the magnitude of the Faraday rotation for magneto-optical readout with various Qs of the films. The paper was recommended by the Department (Kafedra) of Construction and Production of Apparatus, Leningrad Institute of Precision Mechanics and Optics. Figures 1; references: 2 Russian.
[274-6415]

POWER SYSTEMS (INCLUDING EFFECT OF VARIOUS ITEMS ON POWER TRANSMISSION)

UDC 621.614.1:621.314.54

CALCULATION OF THE OPERATING MODES OF A RECTIFIER-REACTOR-INVERTER CONVERTER SYSTEM

Minsk IZV. VUZ: ENERGETIKA in Russian No 5, May 80 pp 12-17 manuscript received 21 Jan 80

ALLILUYEV, A. A., candidate of technical sciences, Order of Labor's Red Banner Novocherkassk Polytechnic Institute imeni S. Ordzonikidze, and SHINKARENKO, G. V., engineer, Economic Planning Department, Don Basin Power System

[Abstract] An algorithm of calculating the transients in a rectifier-reactor-inverter system is shown which has been programmed for a digital computer. This algorithm is based on the equivalent circuit of such a converter system with three phases on the a.c. side and a single differential equation describing it, an equation for the current on the d.c. side as a function of the angular displacement of the equivalent generators and with the number of converter phases as one of the parameters. The same solution, a trigonometric equation, is used for calculating the current in a continuous sequence of intervals of an invariable system structure. Typical results have been obtained for m = 6 and 12 converter phases. The paper was presented by the Department (Kafedra) of Electrical Power Plants. Figures 2; tables 2; references: 3 Russian.
[289-2415]

UDC 531.383

CONCERNING STABILITY OF A GYROSCOPE WITH AN INTERNAL CARDON SUSPENSION ON A VIBRATING BASE

Leningrad IZV. VUZ: PRIBOROSTROYENIYE in Russian Vol 23, No 5, May 80
pp 53-57 manuscript received 7 Aug 79

LESTEV, A. M.

[Abstract] Nonlinear resonance phenomena are considered which develop during operation of a gyroscope with an internal cardon suspension on a vibrating base and the conditions for stability of the gyroscope in resonance conditions are presented. The resonance phenomenon considered is coincident with the axis of rotation of the gyroscope shaft. With angle $\gamma(t)=0$, nonlinear resonance phenomena are not displayed. The growth of resonance phenomena of a gyroscope with an internal cardon suspension, caused by vibration of the base, differs from the resonance modes of a gyroscope in an ordinary cardon suspension. From the conditions of stability shown in the paper for a gyroscope in resonance conditions, it follows that an increase of the damping and misalingment coefficients promotes stability. An increase of resonance phenomena disrupts the normal regime of an operating device. The conditions for stability of a gyroscope in resonance conditions can be used during design of gyroscopic devices. The paper was recommended by the Department (Kafedra) of Theoretical Mechanics, Leningrad Institute of Aviation Instrument Building. Figures 2; references: 5 Russian.
[274-6415]

UDC 621.396.9

ANALYSIS OF THE INFLUENCE OF TIME SELECTION OF A SIGNAL REFLECTED FROM A SURFACE ON THE MEASURING PRECISION OF THE GROUND SPEED

Leningrad IZV. VUZ: PRIBOROSTROYENIYE in Russian Vol 23, No 5, May 80
pp 3-6 manuscript received 11 Jul 79

OVCHINIKOV, L. Ye. and SHCHERBAKOV, A. A.

[Abstract] In 1964 and 1978 works from the literature, the possibility is shown of measuring the modules of the ground speed V of an aircraft with the use of a weakly directional antenna. This possibility is achieved by the use of a probing signal with good resolution with respect to distance and speed, which makes it possible by the method of time selection to separate all the reflecting surface into individual parts, in the limits of each of which the partial reflected signals have time delays differing not more than by the magnitude of the correlation interval of

the probing signal. However, the requirement for simplicity of technical achievement forced in a number of cases is restricted to the use of a signal reflected from only one of the above-mentioned parts. Consequently, determination of the accuracy of the position of this part is of importance. The present paper considers the choice of the optimum time position of the selecting signal in the case of such a measurer of ground speed, using an antenna with weakly-expressed directional properties. The results obtained can be used during construction of a doppler measurer of ground speed with employment of a small-size antenna with weakly expressed directional properties. The paper was recommended by the Leningrad Institute of Aviation Instrument Building. Figures 3; references: 3 Russian.
[274-6415]

UDC 621.396.96

DEPENDENCY OF MATCHING ACCURACY OF RADAR MAPS ON THE RANGE OF LOCATOR OPERATION

Leningrad IZV. VUZ: PRIBOROSTROYENIYE in Russian Vol 23, No 5, May 80
pp 24-27 manuscript received 15 Apr 79

[Abstract] It has been shown in the literature that the precision of correlation-extremal coordinates using radar maps corresponds with the aid of the method of least squares to the matching accuracy of the maps. The minimum dispersion of the matching error with respect to the "non-energy" parameter λ, which has the sense of a mutual linear, angular or scaled mismatching of the maps, can be attained with fulfillment of the condition that one of the maps is "standard" and the other its duplicate plus additive noise with a zero norm. An expression is shown for such dispersion in the case where N-dimensional samples of brightness arranged on the point raster are equal. The present paper is concerned with the structure of the theoretical dependence of the above dispersion on the radar range, and its comparison with experimental results. The paper was recommended by the Department (Kafedra) of Optimum and Adaptive Control Systems, Tomsk Institute of Automatic Control Systems and Radio Electronics. Figures 3; references 5: 4 Russian; 1 Western in translation.
[274-6415]

UDC 536.2.21

INVESTIGATION OF THE THERMAL CONDUCTIVITY OF POROUS GLASS

Leningrad IZV. VUZ: PRIBOROSTROYENIYE in Russian Vol 23, No 5, May 80
pp 90-92 manuscript received 20 Jun 78

VOLKOV, D. P., ZARICHNYAK, Yu. P. and MESHKOVSKIY, I. K.

[Abstract] It is possible to obtain structures with communicating pores, the dimensions of which (pores) can be controlled within wide limits, by acid etching of the separate components in glasses of complex composition. Such porous glasses are used, for example, as thin filters and optical materials with variable refractive indices. The present paper is concerned with an experimental and theoretical investigation of the thermal conductivity of porous glasses ("wide porous" with a radius of the pore of 1000--2000 Å and "small porous" with a radius of the pore of 80 Å) as a function of temperature and porosity. The possibility is shown of forecasting the thermal conductivity of porous glasses by the known value of their density and the thermal conductivity of monolithic glass. The paper was recommended by the Department (Kafedra) of Thermophysics, Leningrad Institute of Precision Mechanics and Optics. Figures 3; references: 3 Russian.
[274-6415]

CSO: 1860

- END -

END OF FICHE

DATE FILMED

Sept. 19, 1980

O.S.